

DEPARTMENT OF
ENVIRONMENTAL QUALITY
PERMITTING & COMPLIANCE DIVISION
SOLID WASTE MANAGEMENT PROGRAM
406/444-1430

FAX # (406) 444-1499

STATE OF MONTANA

OFFICE LOCATION: 2209 PHOENIX AVE.
HELENA, MONTANA

MAILING ADDRESS: PO BOX 200901
HELENA, MT 59620-0901



July 25, 1996

Bruce Gilbert
Environmental Affairs Manager
Stillwater Mining Company
HC 54, Box 365
Nye, MT 59061

Dear Mr. Gilbert:

Thank you for your letter of July 1, 1996. The use of smelter gypsum from the Stillwater Mine is approved for use as alternative daily cover at Class 2 landfills in Montana, provided that the material is dry enough to pass the paint filter test.

If you have any further questions on this matter, please feel free to contact me.

Sincerely,

A handwritten signature in cursive script that reads "F. Patrick Crowley".

F. Patrick Crowley
Solid Waste Regulatory Lead

Enclosure: Paint filter test handout.

cc: Big Timber Landfill

File: Big Timber Landfill, Operations Plan
Path: CB5403\wp\landfill\applicat\BTADC.

Initials

Date

7/25

SOLID WASTE PROGRAM ROUTE SLIP☐ NEW APPLICATION

Initial / Date

Jim W.
Jon D.
Proof
Cathy
Roger

☐ NEW LICENSE

Initial / Date

Jim W.
Jon D.
Proof
Carol
Cathy
Roger

☐ HEALTH OFFICER CARD

Initial / Date

Jim W.
Carol
Cathy

☐ INSPECTIONS

Initial / Date

Pat C.
Jon D.
Proof
Carol
Roger

☐ INTERIM CLOSURES

Initial / Date

Jim W.
Jon D.
Proof
Carol
Cathy
Roger

☐ CLOSURES

Initial / Date

Jim W.
Jon D.
Proof
Carol
Cathy
Roger

☐ CHANGE IN LICENSE
FOR FEE STATUS

Initial / Date

Jim W.
Jon D.
Proof
Cathy
Roger

☐ COMPLAINTS

Initial / Date

Pat C.
Jon D.
Proof
Roger
Carol (filing & DBase)

☒ GENERAL CORRESPONDENCE

Initial / Date

Pat C./~~Jim W.~~
Jon D.
Proof
~~Roger~~

FAE 7/25
JD 7/25
Tom 7-25

☐ MISCELLANEOUS

Initial / Date

Mail 7-25 - Tom

PAINT FILTER LIQUIDS TEST

1.0 SCOPE AND APPLICATION

1.1 This method is used to determine the presence of free liquids in a representative sample of waste.

1.2 The method is used to determine compliance with 40 CFR 264.314 and 265.314.

2.0 SUMMARY OF METHOD

2.1 A predetermined amount of material is placed in a paint filter. If any portion of the material passes through and drops from the filter within the 5-min test period, the material is deemed to contain free liquids.

3.0 INTERFERENCES

3.1 Filter media were observed to separate from the filter cone on exposure to alkaline materials. This development causes no problem if the sample is not disturbed.

4.0 APPARATUS AND MATERIALS

4.1 Conical paint filter: Mesh number 60 (fine meshed size). Available at local paint stores such as Sherwin-Williams and Glidden for an approximate cost of \$0.07 each.

4.2 Glass funnel: If the paint filter, with the waste, cannot sustain its weight on the ring stand, then a fluted glass funnel or glass funnel with a mouth large enough to allow at least 1 in. of the filter mesh to protrude should be used to support the filter. The funnel is to be fluted or have a large open mouth in order to support the paint filter yet not interfere with the movement, to the graduated cylinder, of the liquid that passes through the filter mesh.

4.3 Ring stand and ring, or tripod.

4.4 Graduated cylinder or beaker: 100-mL.

5.0 REAGENTS

5.1 None.

6.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

6.1 All samples must be collected according to the directions in Chapter Nine of this manual.

6.2 A 100-mL or 100-g representative sample is required for the test. If it is not possible to obtain a sample of 100 mL or 100 g that is sufficiently representative of the waste, the analyst may use larger size samples in multiples of 100 mL or 100 g, i.e., 200, 300, 400 mL or g. However, when larger samples are used, analysts shall divide the sample into 100-mL or 100-g portions and test each portion separately. If any portion contains free liquids, the entire sample is considered to have free liquids.

7.0 PROCEDURE

7.1 Assemble test apparatus as shown in Figure 1.

7.2 Place sample in the filter. A funnel may be used to provide support for the paint filter.

7.3 Allow sample to drain for 5 min into the graduated cylinder.

7.4 If any portion of the test material collects in the graduated cylinder in the 5-min period, then the material is deemed to contain free liquids for purposes of 40 CFR 264.314 and 265.314.

8.0 QUALITY CONTROL

8.1 Duplicate samples should be analyzed on a routine basis.

9.0 METHOD PERFORMANCE

9.1 No data provided.

10.0 REFERENCES

10.1 None required.

Figure 1. Paint filter test apparatus.

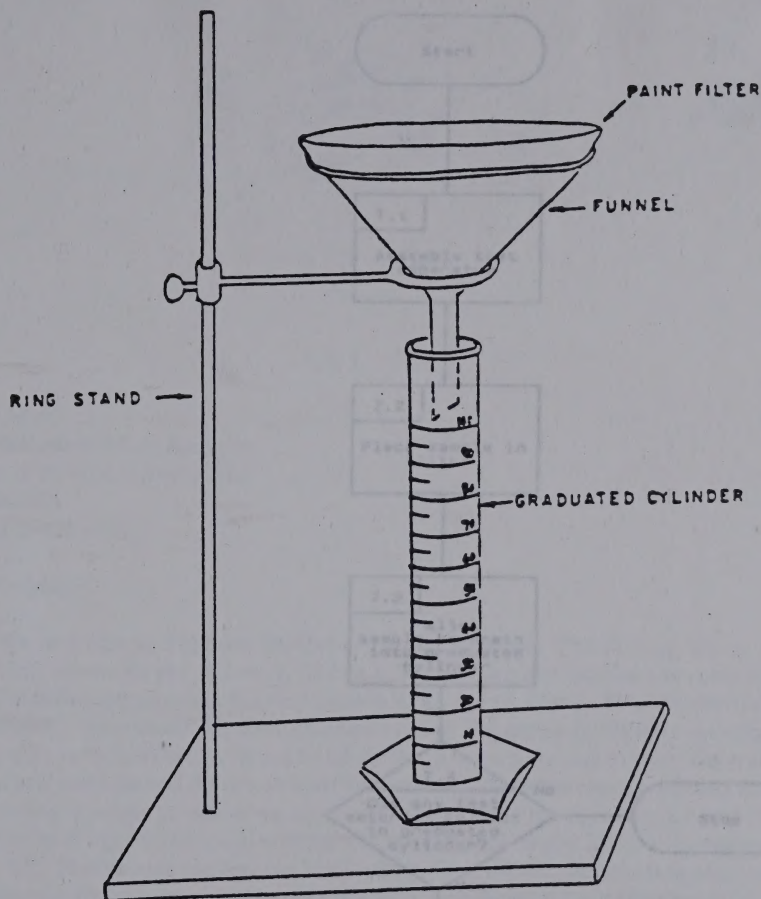
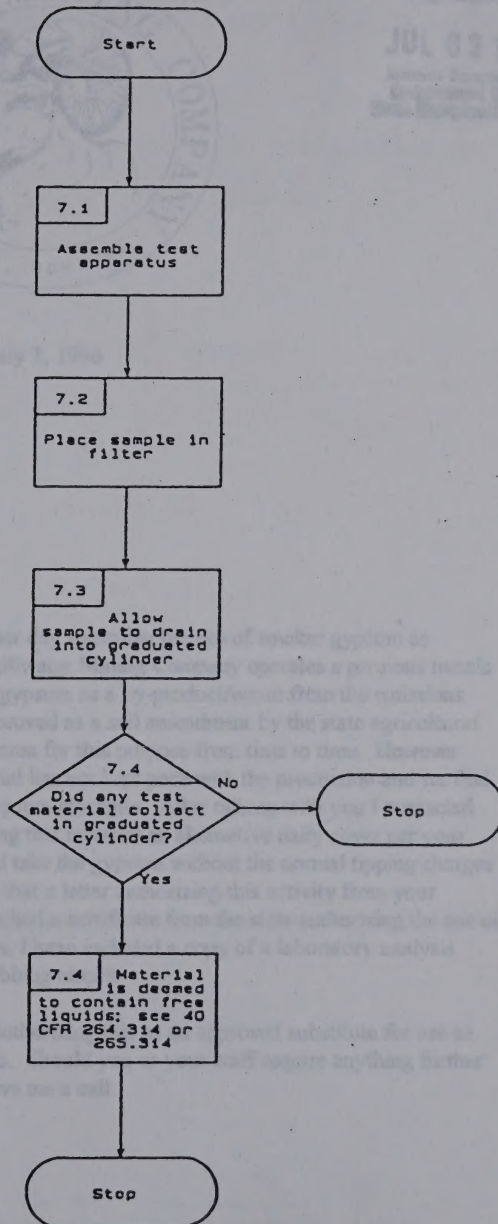


Figure 1. Paint filter test apparatus.

METHOD 9095
PAINT FILTER LIQUIDS TEST



328-8528



RECEIVED

JUL 03 1996

Montana Department of
Environmental Quality
Waste Management Division

July 1, 1996

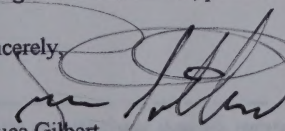
Mr. Pat Crowley
Solid and Hazardous Waste Specialist
Department of Environmental Quality
PO BOX 200901
Helena, MT 59620-0901

Dear Mr. Crowley:

Thank you for your time on the phone the other day regarding the use of smelter gypsum as alternative daily cover. As you are aware, Stillwater Mining Company operates a precious metals smelter in Columbus and generates chemical gypsum as a by-product/waste from the emissions scrubbing circuit. This material has been approved as a soil amendment by the state agricultural department and has been utilized in the local area for this purpose from time to time. However over the last two years demand for this material has not kept pace with the production and we find ourselves needing to reduce the size of our gypsum stockpile. After talking with you I contacted Mr. Ron Thomas of Big Timber about utilizing this material as alternative daily cover per your suggestion. Mr. Thomas said that they would take the gypsum without the normal tipping charges if they could use it for this purpose; provided that a letter authorizing this activity from your agency accompanied the gypsum. I have attached a certificate from the state authorizing the use of this material as a soil amendment. In addition, I have included a copy of a laboratory analysis (TCLP) of the gypsum generated by our scrubbing circuit.

I would greatly appreciate a letter from you authorizing this as an approved substitute for use as alternative daily cover within class 2 landfills. Should you or your staff require anything further in regards to this matter, please feel free to give me a call.

Sincerely,


Bruce Gilbert
Environmental Affairs Manager
Stillwater Mining Company

RECEIVED
JUL 13 1986
Montana Department of
Environmental Quality
Butte, Montana 59715



July 1, 1986

Mr. Pat Crowley
Solid and Hazardous Waste Specialist
Department of Environmental Quality
PO BOX 100001
Helena, MT 59620-0001

Dear Mr. Crowley:

Thank you for your time on the phone the other day regarding the use of smelter gypsum as alternative daily cover. As you are aware, Stillwater Mining Company operates a precious metals smelter in Columbia and generates chemical gypsum as a by-product/waste from the smelting scrubbing circuit. This material has been approved as a soil amendment by the state agricultural department and has been utilized in the local area for this purpose from time to time. However, over the last two years demand for this material has not kept pace with the production and we find ourselves needing to reduce the size of our gypsum stockpile. After talking with you I contacted Mr. Ron Thomas of Big Timber about utilizing this material as alternative daily cover for your suggestion. Mr. Thomas said that they would take the gypsum without the normal gypsum charges if they could use it for this purpose, provided that a letter authorizing the activity from you, ideally accompanied the gypsum. I have attached a certificate from the state authorizing the use of this material as a soil amendment. In addition, I have included a copy of a laboratory analysis (TCLP) of the gypsum generated by our scrubbing circuit.

I would greatly appreciate a letter from you authorizing this as an approved substance for use as alternative daily cover within class 2 landfills. Should you or your staff require anything further in regards to this matter, please feel free to give me a call.

Sincerely,

Bruce Gilbert
Environmental Affairs Manager
Stillwater Mining Company

AGRICULTURAL SCIENCES DIVISION
MONTANA DEPARTMENT OF AGRICULTURE
P.O. BOX 200201
HELENA, MONTANA 59620-0201

**CERTIFICATE OF FERTILIZER
OR SOIL AMENDMENT REGISTRATION**

DECEMBER 28, 1995

PAGE 1

GREG ROSET
STILLWATER MINING CO
PO BOX 1209
COLUMBUS, MT 59019

PHONE NO.: 406-328-6400

ID==> 284-A

REG. CODE	BRAND NAME PRODUCT NAME
--------------	----------------------------

GRADE

MICRO-NU.

2058-A

SMC

CALCIUM SULFATE

GYPSUM

This certifies that the products listed above are registered in Montana effective January 1, 1996 through December 31, 1996 .
The products listed must be labeled in accordance with LABELS OR FACSIMILES SUPPLIED TO THE DEPARTMENT.

APPROVED

Janet K. Holland

U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF PLANT INDUSTRY
WASHINGTON, D.C. 20250

CERTIFICATE OF ANALYSIS
OF SOIL AMENDMENT REGISTRATION

DATE OF ANALYSIS: 1955

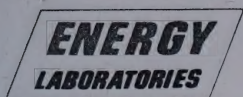
REGISTRATION NO. 100-100-100

100-100-100

ANALYST: J. H. HARRIS
TO: HON. J. H. HARRIS
COLUMBIA, MO. 65201

DATE	ANALYST	TO	FROM
1955-10-10	J. H. HARRIS	HON. J. H. HARRIS	COLUMBIA, MO. 65201

[Signature]



ENERGY LABORATORIES, INC.

P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

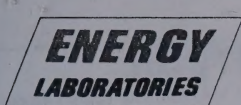
TO: James F. Richter
ADDRESS: Stillwater Mining Co.
HC 54, Box 365
Nye, MT 59061

LAB NO.: 93-6526
DATE: 03/02/93 ag

WASTE ANALYSIS TOXICITY CHARACTERISTIC LEACHING PROCEDURE EPA SW-846 METHOD 1311

93-0-55, Gypsum
Sampled 02/19/93
Submitted 02/19/93
Extracted 02/23/93

Metals	CAS No.	Regulatory Limit, mg/l	Minimum Reporting Limit, mg/l	Result, mg/l in Extract	Date Analyzed
Arsenic	7440-38-2	5.0	0.5	<0.5	02/25/93
Barium	7440-39-3	100.0	10.0	<10	02/24/93
Cadmium	7440-43-9	1.0	0.1	<0.1	02/24/93
Chromium	7440-47-3	5.0	0.5	<0.5	02/24/93
Lead	7439-92-1	5.0	0.5	<0.5	02/24/93
Mercury	7439-97-6	0.2	0.02	<0.02	03/01/93
Selenium	7782-49-2	1.0	0.1	<0.1	02/26/93
Silver	7440-22-4	5.0	0.5	<0.5	02/24/93



ENERGY LABORATORIES, INC.

P.O. BOX 30916 • 1107 SOUTH BROADWAY • BILLINGS, MT 59107-0916 • PHONE (406) 252-6325
FAX (406) 252-6069 • 1-800-735-4489

LABORATORY REPORT

TO: James F. Richter
ADDRESS: Stillwater Mining Co.
HC 54, Box 365
Nye, MT 59061

LAB NO.: 93-6526 api
DATE: 03/02/93 ag

WASTE ANALYSIS TOXICITY CHARACTERISTIC LEACHING PROCEDURE SPIKE RESULTS EPA SW-846 METHOD 1311

93-0-55, Gypsaum
Sampled 02/19/93
Submitted 02/19/93
Extracted 02/23/93

Metals	Spike Concentration, mg/l	Spike Percent Recovery	Date Analyzed
Arsenic	0.25	93	02/25/93
Barium	2.5	85	02/24/93
Cadmium	2.5	79	02/24/93
Chromium	2.5	75	02/24/93
Lead	2.5	82	02/24/93
Mercury	0.002	102	03/01/93
Selenium	0.010	84	02/26/93
Silver	2.5	71	02/24/93

Secret Draft

ROUTE SLIP

DEPARTMENT OF HEALTH & ENVIRONMENTAL SCIENCES

TO: *2006 Jan JD* DATE: *9/1/94*

1. _____
2. _____
3. _____

- | | | |
|--|---|---|
| ☒ Approval | ☐ Comment | ☐ Necessary Action |
| ☐ Note and Return | ☐ Note and File | ☐ Investigate |
| ☐ Prepare reply | ☐ Signature | ☐ See Me |
| ☐ As requested | ☐ For your information | ☐ Per Conversation |

REMARKS:

F:\SHR\BigT.OPS

FROM: *[Signature]*

Mailed 9-2-94

DEPARTMENT OF ENVIRONMENTAL SCIENCES

Management Division
Waste Program
44-1430

FAX # (406) 444-1499

MONTANA

MAILING PO BOX 200901
ADDRESS: HELENA, MT 59620-0901

the Big Timber Landfill's Plan of
letter of June 2, 1994 and have the

regulatory requirements for the waste
1. Please remember that all of the
made a part of your operating record
g Department inspections.

Methane Monitoring

The regulatory requirements for methane monitoring are 25% of the LEL in facility structures and 100% of the LEL at the property boundary. Since the requirements also include that the monitoring be based on site soils, hydrogeology, potential pathways, potential barriers, water levels, and the structures and property boundaries (i.e. distance to the boundary and then the distance to other persons). The methane monitoring plan should include:

1. A map depicting the proposed locations for methane monitoring should be supplied to the Department for approval. This map should show the location of any nearby structures as well as facilities at the landfill.
2. Depth of the proposed probe locations. The methane monitoring points must be located based on the depth to the water table and the depth of any nearby refuse as well as the pathways (like sand lenses) and barriers (such as frost in the winter). The geology at the Big Timber site is such that the water beneath the landfill is mostly in what is called a confined aquifer. This indicates that most of the methane migration pathways should be above this level. Special attention should be paid to shallow sand lenses that are intercepted by the trenches at the landfill.

DEPARTMENT OF
HEALTH AND ENVIRONMENTAL SCIENCES
Waste Management Division
Solid Waste Program
406/444-1232



STATE OF MONTANA

MAILING TO YOU FROM
ADDRESS WITHIN MT. DEPARTMENT

POST OFFICE BOX 112
HELENA, MONTANA 59601

September 1, 1994

Kevin C. Hutchinson
City of Big Timber Landfill
PO Box 112
Big Timber, MT 59011

Dear Mr. Hutchinson:

I have reviewed the additions to the Big Timber Landfill as they are
Operations as proposed in your letter of June 1, 1994 and have the
following comments:

Waste Storage Area

The plan as proposed meets the regulatory requirements for the waste
storage area at the landfill. Please remember that all of the
waste remaining records should be made a part of your operating record
and be available for review during Department inspection.

Waste Handling Area

The regulatory requirements for waste handling are set out in the
landfill standards and part of the plan as the property boundary.
Since the requirements also include that the monitoring be based on
the entire property, including potential future, potential future,
water levels and the surrounding and property boundaries. The
distance to the boundary and the distance to other persons. The
waste handling plan should include:

1. A map showing the proposed location for waste handling
should be included in the permit application. This map should
show the location of any nearby structures as well as facilities at
the landfill.

2. Each of the proposed waste handling locations. The waste handling
points must be located based on the distance to the water table and the
depth of any nearby structures as well as the property boundary. The property at the Big
and distance from the water table. The property at the Big
Timber site is such that the water table is mostly in
the area of the landfill. This indicates that most of the
waste handling should be above the water table. The
attention should be paid to the distance from the water table
by the trenches at the landfill.

Big Timber
September 2, 1994
Page Two

3. Suggested locations include on the fence line due West of the current trench, by the gate, and on the fence line due south of the trenches.

4. Culverts should be sampled. Methane/CO₂ mixtures are heavier than air and tend to accumulate in low lying areas.

5. The make and model of the methane meter selected should be supplied to the Department. It should be calibrated with an appropriate methane gas mixture and operated according to the manufacturer's instructions.

I am enclosing a copy of a simple methane plan from Valley County for your information.

Leachate Collection System

The leachate collection system must be operated so that no more than 1 foot accumulates prior to removal. The use of the same probe to measure water levels in the leachate system and the ground water monitoring wells is strongly discouraged. One accidental cross contamination will more than nullify any cost savings of not using dedicated equipment. A simpler method, such as the use of a series of 1 inch PVC pipe sections to probe the leachate riser might be just as effective and cheaper.

The design of the current cell's leachate collection system does not meet the new requirements of Department regulations adopted as a result of the EPA's Subtitle D rules. The next cell (trench) will require a liner and leachate collection system that meets the requirements of ARM 16.14.506. Unfortunately, the Department is not in the landfill design business and will only be able to review designs presented to insure that they meet the regulatory requirements. I would urge you, if you will be continuing to use the landfill beyond the life of the current cell, to begin the design process at least a year in advance of the need for additional space. The design, bidding, and construction may take longer than anticipated. Design requirements are specified in ARM 16.14.506.

Ground Water Monitoring

There appears to be some confusion regarding the status of ground water monitoring at the Big Timber Landfill. As Patricia Potts stated in her letter of April 19, 1994, the seven wells present at the site are adequate to provide for the initial hydrogeological characterization of the site but are not necessarily adequate as a monitoring network. In that letter she also said that Big Timber should immediately begin monthly water level measurements so that an assessment of the flow direction could be made in August and a determination of the adequacy of the existing well placement could be

1. Suggested locations include on the farm line the west of the
current stream, by the gate, and on the fence line the south of the
stream.

2. Efforts should be made. Methanol, which is heavier than
air, and tends to accumulate in low lying areas.

3. The water and sand of the methane water collected should be
supplied to the Department. It should be collected with an
appropriate methane gas mixture and operated according to the
manufacturer's instructions.

I am enclosing a copy of a single methane gas from Valley County for
your information.

Leach's Collection System

The Leach's Collection System will be operated so that no more than
1 foot of methane gas is removed. The use of the system is to
remove methane gas from the Leach's system and the ground water
underneath it is strongly discouraged. The Leach's system
consists of a well which is not used for collection of
methane gas. A higher level of methane gas is not used for
collection of methane gas. The Leach's system is not used for
collection of methane gas.

The design of the Leach's well is a Leach's Collection System does not
have the same requirements of Leach's Collection System as a
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Leach's Collection System

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The Leach's Collection System is not used for collection of methane gas.

Big Timber
September 2, 1994
Page Three

made prior to October 9, 1994. Since these measurements were not performed, the Department does not have the additional information required to make a decision on these matters. Please commence the required monthly water level measurements at once.

One of the primary reasons for sampling all seven wells was the ability to create a sufficient population of samples for the required statistical evaluation of sampling results. The lack of water level measurements may require that the Department, instead of being able to evaluate a proposed monitoring network, may have to require that a second round of sampling be conducted on all seven wells again in the spring, rather than concentrating the sampling on a reduced number of properly located wells. Please consult with Huntingdon Chen-Northern on the groundwater data analysis required by ARM 16.14.706(12).

A sampling and analysis plan for the landfill is also required. For the first event, the Standard Operating Procedures used by Huntingdon will suffice as this firm has been active at several landfills in Montana and is familiar with Department regulations. They can advise you on the requirements of ARM 16.14.706(1).

Closure Plan

For the time being, the Department has accepted the closure plan as presented on Plan Sheet 4 of 9. "Final Contour Plan" of the Damschen and Associates plans for the landfill dated February 1990. This design may have to change as the Big Timber Landfill progresses to lined cells. The permeability of the final cover infiltration layer must contain a minimum 18 inches of earthen material and have a permeability less than or equal to the permeability of any bottom liner, barrier layer, or natural subsoils present, or a permeability no greater than 1×10^{-5} cm/sec, whichever is less. I would also call your attention to the construction QA/QC requirements of final cap design specified in ARM 16.14.506(12). The requirements normally require the services of a professional engineer.

The closure of landfill units must be completed within 180 days of the start of closure activities. The unit must be revegetated within one year. The vegetation of closed areas should be done with a grass mix approved by the Soil Conservation Service for the area.

A notation must be placed on the deed to the property indicating that it was used as a landfill.

An estimate of the cost of a third party to close the largest area of the landfill requiring final closure (and proof of the financial mechanism to provide for the closure) must be provided to the Department by April 9, 1994. This estimate must be annually updated and appropriately funded. Must Montana towns do not have the

Made prior to October 1, 1934. Since these measurements were not
permitted, the Department does not have the additional information
required to make a decision on these matters. Please comment the
required monthly water level measurements at once.

One of the primary reasons for sampling all seven wells was the
ability to create a sufficient population of samples for the required
statistical evaluation of sampling results. The lack of water level
measurements may indicate that the Department, instead of being able to
evaluate a proposed monitoring network, may have to require that a
second round of sampling be conducted on all seven wells again in the
spring, rather than concentrating the sampling on a reduced number of
properly located wells. Please consult with Washington State Department
on the groundwater data analysis required by ARS 16-14-706(1).

A sampling and analysis plan for the landfills is also required. For
the first event, the Standard Operating Procedures used by Washington
will require as this time has been active at several landfills in
Washington as familiar with Department regulations. They are active
yes on the requirements of ARS 16-14-706(1).

Groundwater

For the time being, the Department has accepted the closure plan as
presented as this event is at a final closure plan of the landfills
and investigation plans for the landfills dated February 1934. This
action may have to change as the Big Timber landfills progress in
lined cells. The permeability of the final cover infiltration layer
must contain a minimum of 12 inches of earth material and have a
permeability less than or equal to the permeability of any bottom
layer, bottom layer, or natural subsurface present, or a permeability
no greater than 1 x 10⁻¹⁰ cm/sec, whichever is less. I would also call
your attention to the requirement for a permeability at final cap
design specified in ARS 16-14-706(1). The requirements normally
regarding the nature of a geological engineer.

The closure of landfills must be completed within 180 days of the
start of closure activities. The unit must be completed within one
year. The vegetation of closed areas should be done with a grass mix
approved by the Soil Conservation Service for the area.

A location must be placed on the map to the property indicating that
it was used as a landfill.

An estimate of the cost of a third party to close the largest area of
the landfills required to final closure (and proof of the financial
resources to provide for the closure) must be provided to the
Department by April 1, 1935. This estimate must be annually updated
and appropriately funded. Your comments below do not have the

Big Timber
September 2, 1994
Page Four

financial depth to provide the required financial assurance without setting up a dedicated trust fund. Financial assurance requirements are delineated in ARM 16.14.540.

A 30 year post closure care period is also required. These requirements are specified in ARM 16.14.531(1) and include:

(a) Following closure of each Class II landfill unit, the owner or operator must conduct post-closure care. Post-closure care must be conducted for 30 years, except as provided under (b) of this subsection, and consist of at least the following:

(i) Maintaining the integrity and effectiveness of any final cover, including making repairs to the cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run-on and run-off from eroding or otherwise damaging the final cover;

(ii) Maintaining and operating the leachate collection system in accordance with the requirements in ARM 16.14.506. The department may allow the owner or operator to stop managing leachate if the owner or operator demonstrates that leachate no longer poses a threat to human health and the environment;

(iii) Monitoring the ground water in accordance with the requirements of ARM Title 16, chapter 14, subchapter 7, and maintaining the ground water monitoring system, if applicable; and

(iv) Maintaining and operating the gas monitoring system in accordance with the requirements of ARM 16.14.521.

Following the thirty year post closure care of the unit, a certification by a P.E. must be submitted to the Department.

Run-off control and the Montana Pollution Discharge Elimination System (MPDES) Permit

Barry Damschen sized the run-off detention pond to handle the 24 hour, 25 year precipitation event. This meets current requirements. Your Operations Plan should also reflect a commitment to use appropriate Best Management Practices (BMP's) to eliminate possible point and non-point sources at the landfill. I have attached a copy of the EPA suggestions on BMP's at landfills for your reference.

Because the Big Timber Landfill pond design includes two potential discharge points, the spillway and the pipe, it will also require a Stormwater Discharge Permit from the Water Quality Division. Please contact Roxanne Lincoln at 444-5338 for the appropriate application form.

I hope this review of your submittal has been helpful. We understand that landfill operations under the new rules required by the EPA is

financially capable to provide the required financial resources without
relying on a dedicated revenue fund. Financial resources requirements
are calculated in ARW 14.14.540.

A 10 year post closure costs period is also required. These
requirements are specified in ARW 14.14.5311 and include:

- (a) Following closure of each Class II landfill unit, the
owner or operator must conduct post-closure care. Post-closure
care must be conducted for 10 years, except as provided under (b)
of this subsection, and consist of at least the following:
 - (i) Maintaining the integrity and effectiveness of any
final cover, including making repairs to the cover as necessary
to prevent the release of methane, substances, erosion, or
other wastes, and preventing run-on and run-off from creating or
enhancing the final cover.
 - (ii) Maintaining and operating the leachate collection
system in accordance with the requirements in ARW 14.14.540. The
landowner may allow the owner or operator to stop managing
leachate if the owner or operator demonstrates that leachate no
longer poses a threat to human health and the environment.
 - (iii) Maintaining the ground water in accordance with the
requirements of ARW Title 14, Chapter 14, Subchapter 2, and
maintaining the ground water monitoring system, if applicable.
- (b) Maintaining and operating the gas monitoring system in
accordance with the requirements of ARW 14.14.541.

Following the thirty year post closure care of the unit, a
certification by a P.E. must be submitted to the Department.

Section 14.14.541 and the 14.14.542 are the separate certification system
requirements.

Barry Anderson filed the run-off assessment form on January 14, 1994.
10 year post-closure care. This form must be submitted to the
Department. This form is also used to determine if the unit is
eligible for the 10 year post-closure care period and non-
point assessment program. I have attached a copy of the form
you submitted at the landfill. I have attached a copy of the form
submitted on 8/17/94 to landfill for your reference.

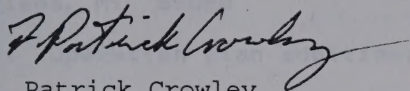
Because the Big Timber landfill bond design includes two potential
closure points, the agency and the city. It will also require a
separate bond design from the Water Quality Division. Please
contact Barbara Lusk at 405-231-1111 for the appropriate application
form.

I hope this review of your assessment has been helpful. We understand
that landfill operations under the new rules required by the EPA is

Big Timber
September 2, 1994
Page Five

much more complex than before. If we can be of further help, please feel free to contact any of us at the Solid Waste Program.

Sincerely,



F. Patrick Crowley
Solid Waste Regulatory Lead

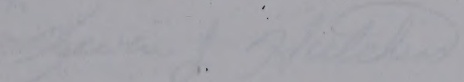
Enclosures: Valley County Methane, EPA BMP's

Big Timber
File: Twin Bridges Landfill\Sweet Grass County
Path: H:\cb5403\wp\landfill\BIGT.OPS

I would like to thank Lora Gandy for her time and understanding, Jim Miller for his willingness to take the time to answer questions of Big Timber, and Pat Crowley for his detailed explanation of the rules and regulations.

I am sure I will hear from you soon.

Sincerely,



Kevin J. Hutchinson

RECEIVED
JUN 03 1994

WILLIAM L. HUGHES JR. JR.
AND ASSOCIATES, P.C.

Page Five
September 2, 1984
Big Timber

such more complex than before. If we can be of further help, please
feel free to contact any of us at the Solid Waste Program.

Sincerely,

Patrick Crowley
Patrick Crowley
Solid Waste Regulatory Lead

Enclosures: Valley County Records, EPA 840-1

Patrick Crowley
Solid Waste Regulatory Lead
EPA Region 8
Denver, Colorado

June 2, 1994

Department of Health and
Environmental Sciences,
Solid and Hazardous Waste Bureau
Helena, MT 59620

Re: Operation plan additions.

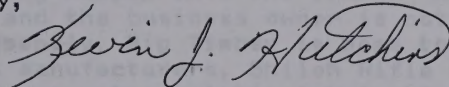
Dear Sirs,

Enclosed you will find the information you requested. The City understands that this is the first draft of the proposed operational plan changes. Any changes or ideas from your department will be appreciated.

I would like to thank Lora Dando for her time and understanding, Jim Wilbur for his willingness to face the mis-informed citizens of Big Timber, and Pat Crowley for his simplistic explanation of the rules and regulations.

I am sure I will hear from you soon.

Sincerely,



Kevin J. Hutchins

RECEIVED

JUN 03 1994

MONTANA DEPARTMENT OF HEALTH
AND ENVIRONMENTAL SCIENCES

WASTE SCREENING

Big Timber has in place a waste screening program during the regular day to day operations of the Solid Waste Department. The Solid Waste personnel come into actual physical contact with all residential waste generated within the city limits. The Solid Waste personnel will accept liquid wastes from residential customers, with certain restrictions. These restrictions include:

1. Paint
 - a. two gallons maximum per stop
 1. the city would prefer the lids on the cans be removed for 3-4 days to allow the VOC's to escape.
2. Used crankcase oil
 - a. one gallon maximum in clear milk jug.
3. No 5 gallon container of any liquid will be accepted.

COMMERCIAL CUSTOMERS

Most commercial customers are picked up on a by the can basis therefore the city personnel can monitor the waste as it is being dumped into the truck. Any questionable waste is removed and the business owner is notified.

Presently, Big Timber is home to one of Montana's finest firearms manufacturers, Shiloh Rifle Company. The rifle company uses water soluble lubricating oil on their machines, and also uses a spinner to reclaim cutting oil from their metal filings.

Big Timber's garages and service stations either use their crankcase oil as fuel for heaters or contract to have the oil removed. All oil filters are punctured and drained before entering the waste stream.

AT THE LANDFILL

Customers at the landfill generally bring refuse to the landfill in the back of a pick-up. The city personnel inspect each load before it is dumped at the working face.

The Big Timber landfill has very few loads that are larger than pick-up size. These loads are generally dump truck and stock truck size. The larger loads are inspected after being dumped at the working face.

City personnel continue to inspect all refuse at the working face during the compaction and burying procedure.

The city will construct a simple waste screening pad following the guidelines on page 37 figure 7 of the Waste Screening at Municipal Solid Waste Management Facilities guidebook. This pad will be used for all questionable loads that enter the landfill.

If the city personnel find any waste that is unacceptable, we will contact the department of Health and Environmental Sciences, Solid and Hazardous Waste Bureau, and we will also contact Chen-Northern, Inc. Methane and Carbon Dioxide are the primary constituents. Methane is explosive and can collect in buildings or other confined spaces. Methane is combustible at concentrations levels between five percent (VLEL) and fifteen percent (UEL) in air.

Methane is lighter than air and tends to rise through refuse or soil and vent into the atmosphere. If possible methane gas meters will be used to measure the concentration 4 times per year in facility structures, in leachate rivers, and at the facility property boundaries.

The Big Fisher landfill operators will ensure that the concentration of methane gas generated by the facility does not exceed 25% of the lower explosive limit for methane in those areas that are monitored.

Handwritten: Methane gas meters will be used.

Location:

Handwritten: methane gas meters will be used. (Methane gas meters)

Handwritten: 1) Methane gas meters

Handwritten: 2) 100% methane gas meters

Handwritten: Sand

METHANE MONITORING

Landfill gas (LFG), produced during biodegradation of the waste can migrate through soils. Methane and Carbon Dioxide are the primary constituents. Methane is explosive and can collect in buildings or other confined spaces. Methane is explosive at concentrated levels between five percent (LEL) and fifteen percent (UEL) in air.

Methane is lighter than air and tends to rise through refuse or soil and vent into the atmosphere. A portable methane gas meter will be used to measure the concentration 4 times per year in facility structures, in leachate riser, and at the facility property boundaries.

The Big Timber landfill operators will ensure that the concentration of methane gas generated by the facility does not exceed 25% of the lower explosive limit for methane at those areas that are monitored.

Need map of L.F. showing proposed locations.

- 1) What meter will be used. (Mettler carbamate)*
- 2) Quarterly monitor.*
- 3) 100% LEL required -*

Send.

LEACHATE COLLECTION SYSTEM

Purpose

The leachate collection system is designed to collect and convey leachate from the bottom of each pit. A series of perforated pipes are used for this purpose.

In order to detect and collect any leachate that may be generated in the most effective and economical method possible, the operation plan has been developed such that the base elevation of the various trenches slope in a down gradient direction toward the south side of the landfill.

Installation

Filter fabric was placed in the 3:1 slope trench for the leachate pipe.

A layer of coarse aggregate was placed over the fabric, then the pipe was put in. Another layer of coarse aggregate was placed over the pipe, and geo textile fabric was put down to help stop migration of waste and clay particles through the coarse aggregate that may clog the collection pipes.

Cleanout Risers

Cleanout risers are located on the west side of the trench and out of the fill area. The riser is protected by a six foot piece of steel pipe to help guard against accidental damage by landfill equipment.

Monitoring

The city personnel will check monthly for any leachate in the collection system. If leachate is found in sufficient quantities to cause alarm the city will contact the Department of Health and Environmental Sciences, Solid and Hazardous Waste Bureau and Chen Northern Inc.

The leachate riser is equipped with a steel cap that is padlocked at all times. After testing for leachate in the collection system, the probe must be cleaned to prevent the contamination of any groundwater monitoring wells. The probe will be used to measure the groundwater monitoring wells, also. The cleaning or decontaminating will be done per manufacturer's instructions.

LEACHATE COLLECTION SYSTEM

Purpose

The leachate collection system is designed to collect and convey leachate from the bottom of each pit. A series of perforated pipes are used for this purpose. In order to detect and collect any leachate that may be generated in the east effluent and collection system, the operation plan has been developed such that the base elevation of the various trenches slope in a down gradient direction toward the south side of the landfill.

Installation

Filter fabric was placed in the 24" slope trench for the leachate pipe. A layer of coarse aggregate was placed over the fabric. Then the pipe was set in. Another layer of coarse aggregate was placed over the pipe, and geotextile fabric was put down to help stop migration of waste and clay particles through the coarse aggregate that may clog the collection pipe.

Elemental Risks

Elemental risks are located on the west side of the trench and out of the fill area. The risk is protected by a steel plate of steel pipe to help guard against accidental damage by landfill equipment.

Monitoring

The city personnel will check monthly for any leachate in the collection system. If leachate is found in sufficient quantities to cause alarm the city will contact the Department of Health and Environmental Sciences, Solid and Hazardous Waste Bureau and Chen Northern Inc. The leachate pipe is equipped with a steel cap that is bolted at all times. After testing for leachate in the collection system, the probe must be cleaned to prevent the contamination of any groundwater monitoring wells. The probe will be used to ensure the groundwater monitoring wells are also. The cleaning or decontaminating will be done per manufacturer's instructions.

GROUNDWATER MONITORING

The Big Timber landfill currently has 7 monitoring wells. The city will have all 7 of those wells tested for the required list of parameters/constituents listed in Table 1 of ARM 16.14.706. Upon the department's recommendation, the lab will also check for dichlorodifluoromethane in the down-gradient wells.

The city will also initiate a program for measuring water levels in all of the existing wells on a regular monthly basis. This program would coincide with the leachate collection system check.

The city understands this information will be instrumental in determining which wells will be included in the approved monitoring network, and if any additional wells will be needed.

With this information the city will establish a regular schedule for the required semi-annual ground water sampling. This sampling will coincide as closely as possible with high and low water periods during the year.

The firm of Chen-Northern, Inc. did the initial testing of all the wells and in all probability will do any subsequent testing. The city will advise Chen-Northern that the Department requires a Statement of Qualifications before any testing is done. *take corrective action if needed.*

GROUNDEWATER MONITORING

The Big Tiedor landfill currently has 7 monitoring wells. The city will have all 7 of these wells tested for the required list of parameters/constituents listed in Table 1 of the 1991 IS. 1991. Upon the department's recommendation, the city will also check for dichlorodifluoromethane in the down-gradient wells.

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The City of Chen-Horsham, Inc. did the initial testing of all the wells and in all probability will do any subsequent testing. The city will advise Chen-Horsham that the Department requires a Statement of Qualification before any testing is done.

CLOSURE PLAN

Closure of filled trenches will be the responsibility of the City of Big Timber. Closure activities described below will take place sequentially as areas of the site are brought to final grades.

Closure of Filled Areas

The Big Timber operation plan is to close off a portion of the cell as the filling operation progresses. Final Closure will begin within 30 days after receiving the last shipment of waste. Final closure will be preceded by contacting the Montana Department of Health and Environmental Sciences, Solid and Hazardous Waste Division before closure activities begin.

Closure will consist of placing a buffer soil layer, installing a clay barrier layer, placing eighteen inches of cover soil and six inches of topsoil and seeding with native grasses.

Access to the site following final closure will be controlled by providing a locked gate. The fence surrounding the property will be maintained.

The City personnel will make a monthly check for any erosion problems and take corrective action if needed.

File: Swatgrass
Big Timber I.T.

June 2, 1994

Department of Health and
Environmental Sciences,
Solid and Hazardous Waste Bureau
Helena, MT 59620

Re: Operation plan additions.

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Kevin J. Hutchins

Kevin J. Hutchins

RECEIVED

JUN 03 1994

MONTANA DEPARTMENT OF HEALTH
AND ENVIRONMENTAL SCIENCES

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Leachate Risers

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Monitoring

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Access to the site following final closure will be controlled by providing a locked gate. The fence surrounding the property will be maintained.

The City personnel will make a monthly check for any erosion problems and take corrective action if needed.

RECEIVED

JAN 21 1984

DEPARTMENT OF HEALTH & ENVIRONMENTAL SCIENCES
SOLID AND HAZARDOUS WASTE DIVISION

City of Big Timber

P.O. Box 416
Big Timber, Montana 59011

Clerk (406) 932-5610
Treasurer (406) 932-5611

10

Ed Ihmke,

Here is the City of Big Timber's
policy for accepting and treating
petroleum contaminated soils as of
1-20-94.

Kevin J. Hutchins
Solid Waste Director
City of Big Timber.

RECEIVED

JAN 21 1994

MONTANA DEPARTMENT OF HEALTH
AND ENVIRONMENTAL SCIENCES
OIL AND HAZARDOUS WASTE DIVISION

CITY OF BIG TIMBER

POLICY AND RULES FOR DISPOSING OF PETROLEUM CONTAMINATED SOILS

The City of Big Timber will accept Petroleum Contaminated Soils at the City Landfill upon the following rules:

1. An area of the Landfill has been cleared of vegetation and control berms have been established to control run-off. All Petroleum Contaminated Soils shall be first deposited in this area.
2. Petroleum Contaminated Soils shall be turned at least once per week until the soils have been effectively treated, at which time the soils will be removed for disposal with normal group II wastes.
3. Petroleum Contaminated Soils may be deposited at the landfill at a cost of \$20 per yard.
4. All acceptance, techniques for treating and disposal of Petroleum Contaminated Soils shall meet state and federal regulations as amended from time to time.
5. The City, its agents or employees reserve the right, in their absolute discretion, to refuse to accept any soils or other matter which may contain or be suspected of containing substances which may not be treated nor disposed of at the City landfill.
6. The City, its agents or employees reserve the right, in their absolute discretion, to refuse to accept any soils which the City does not have the physical capacity to treat or dispose of.
7. The City will accept only Petroleum Contaminated Soils created or generated within the City limits of Big Timber. The City shall not accept such soils created, generated or otherwise from outside of Sweet Grass County. The City may consider accepting such soils created or generated within Sweet Grass County, but outside of the City limits, on a case by case basis.
8. To the extent permissible by law, the City reserves the right to, WITHOUT NOTICE, discontinue taking Petroleum Contaminated Soils, or otherwise amend these rules.

Passed by the City Council January 3, 1994.

BIG TIMBER SANITARY LANDFILL

OPERATION PLAN AND LICENSE APPLICATION

February, 1990

Prepared For:

CITY OF BIG TIMBER

Big Timber, Montana

RECEIVED

JUN 26 1994

MONTANA DEPARTMENT OF HEALTH
AND ENVIRONMENTAL SCIENCES



Damschen & Associates, Inc.

CONSULTING ENGINEERS

Helena, Mt.

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A. General

B. Summary of Hydrogeology Of The Site

1. Surface Geology
2. Hydrogeologic Conditions
3. Summary

C. Landfill Plan

1. General
2. Sequence Plan
3. Life of Site
4. Drainage Control
5. Leachate Control

D. Operation Plan

1. Responsibilities
2. General Operating Procedure
3. Trench Excavation
4. Daily Operation Plan
5. Litter & Access Control

Appendix A - License Application

Appendix B - Soil & Groundwater Data

Appendix C - Landfill Plans (Detached)

The plan for the orderly filling of refuse in the 18 acre area located in the north-central area of the site. The plan calls typically for a trench operation. For the most part the trenches will be sloped from north to south to allow for positive drainage. The trenches will be approximately 10 feet deep.

In addition to the area within the trenches, it is proposed to fill waste above the top of the trenches. This will be accomplished by basically extending the trench vertically by utilizing a berm of soil that is excavated from each trench and correspondingly placed on each side of the trench. The sequence of excavating and utilizing the trenches (as indicated on the attached plans) has been designed to allow for such type of operation without interference between the trench excavation and the existing fill operation. Typical trench excavation and filling details are also indicated on the plans.

In regard to final use it is the intent to final contour the site in order that the site can be used for grazing. To allow for this the slopes will be very moderate. Also the site has been designed to provide adequate soil from the existing operations to allow for a minimum of 2.5 feet of soil over all waste. The plan also calls for all suitable topsoil to be stripped and supplied after the landfilling has been completed in each area.

landfilled. According to the hydrogeologic analyses conducted by Chen-Northern, it appears that the silty clay and shale material underlying the site are quite impermeable and provide adequate protection to the groundwater below the site. To provide additional protection to the groundwater, it is recommended that the soils in the bottom one foot of the trenches be recompacted to 95% of maximum density prior to any wastes being placed. To provide a sufficient separation between the wastes and the groundwater, the landfill cut and fill plan has also been designed to not excavate soil and place waste in excess of 10 feet below the ground surface. (See enclosed landfill design plans.)

Hydroponic
still
allows
a 2'
separation

C. Landfill Plan

1. General

A landfill operation plan was developed for the proposed new landfill by Damschen & Associates, Inc. The landfill plan delineates the location of the proposed trenches, drainage structures, fences, roads, buildings as well as existing and proposed base and final elevations. The plan also indicates the estimated quantities of the total soil to be excavated, soil required for daily and final cover and the estimated volume of waste to be placed in the landfill. This information is contained in the plan set that is enclosed. Included in the following paragraphs is a summary of the operation plan features.

2. Sequence Plan

Damschen & Associates, Inc. developed a plan for the orderly filling of refuse in the 18 acre area located in the southcentral area of the site. The plan calls typically for a trench operation. For the most part the trenches will be sloped from north to south to allow for positive drainage. The trenches will be approximately 10 feet deep.

In addition to the area within the trenches, it is proposed to fill waste above the top of the trenches. This will be accomplished by basically extending the trench vertically by utilizing a berm of soil that is excavated from each trench and correspondingly placed on each side of the trench. The sequence of excavating and utilizing the trenches (as indicated on the enclosed plans) has been designed to allow for such type of operation without interference between the trench excavation and the existing fill operation. Typical trench excavation and filling details are also indicated on the plans.

In regard to final use it is the intent to final contour the site in order that the site can be used for grazing. To allow for this the slopes will be very moderate. Also the site has been designed to provide adequate soil from the trenching operations to allow for a minimum of 2.5 feet of cover soil over all waste. The plan also calls for all available top soil to be stripped and reapplied after the landfiling has been completed in each area.

landfilled. According to the hydrogeologic analyses conducted by Chen-Horner, it appears that the silty clay and shale materials underlying the site are quite impermeable and provide adequate protection to the groundwater below the site. To provide additional protection to the groundwater, it is recommended that the hole in the bottom one foot of the trench be reconstructed to 25% of maximum density prior to any wastes being placed. To provide a sufficient separation between the wastes and the groundwater, the landfill cut and fill plan has also been designed to not excavate soil and place waste in excess of 10 feet below the ground surface. (See enclosed landfill design plans.)

C. Landfill Plan

1. General

A landfill operation plan was developed for the proposed new landfill by Gamache & Associates, Inc. The landfill plan describes the location of the proposed trench, drainage structure, roads, roads, buildings as well as existing and proposed base and final elevations. The plan also indicates the estimated quantities of the total soil to be excavated, soil required for daily and final cover and the estimated volume of waste to be placed in the landfill. This information is contained in the plan and that is enclosed. Included in the following paragraphs is a summary of the operation plan features.

2. Operation Plan

Gamache & Associates, Inc. developed a plan for the orderly filling of refuse in the 18 acre area located in the southern portion of the site. The plan calls typically for a trench operation. For the most part the trenches will be sloped from north to south to allow for positive drainage. The trenches will be approximately 10 feet deep.

In addition to the area within the trenches, it is proposed to fill waste above the top of the trenches. This will be accomplished by basically extending the trench vertically by utilizing a bank of soil that is excavated from each trench and correspondingly placed on each side of the trench. The sequence of excavation and utilizing the trenches (as indicated on the enclosed plan) has been designed to allow for such type of operation without interference between the trench excavation and the existing fill operation. Typical trench excavation and filling details are also indicated on the plans.

In regard to final use of the landfill to final contour the site in order that the site can be used for grazing. To allow for this the slopes will be very moderate. Also the site has been designed to provide adequate soil from the trenching operations to allow for a minimum of 2.5 feet of cover soil over all waste. The plan also calls for all available top soil to be stripped and reapplied after the landfilling has been completed in each area.

3. Life of Site

For the design of the landfill, the engineer calculated volumes of available soil material to be obtained from the trench operations. Then utilizing the assumptions that for every 2.4 yards of waste placed into the landfill one cubic yard of soil will be used to provide daily and intermediate cover and that on the average the entire usable area of the landfill will receive a minimum of 2.5 feet of final cover, the engineer then determined the volume of waste that could be deposited into the landfill. Based on these quantities of waste and soil, the final contours were determined. A breakdown of the estimated soil and waste quantities are indicated on the enclosed table.

NEW BIG TIMBER LANDFILL

DESIGN CRITERIA

<u>ITEM</u>	<u>CUBIC YARDS</u>
<u>Total Volume:</u>	
Trenches	200,000
Above Surface	<u>243,000</u>
Total	443,000
<u>Available Soil:</u>	
Trenches	200,000
Other	<u>0</u>
Total	200,000
<u>Soil Requirements:</u>	
Final Cover (2.5 ft)	77,000
Area Between Trenches	22,000
Daily Cover	<u>101,000</u>
Total	200,000
<u>Volume of Waste:</u>	242,000 cy 121,000 Tons (1,000 lbs/cy)
<u>Estimated Life of Site:</u>	61 Years (2,000 Tons/yr)
<u>Waste to Daily Soil Cover Ratio:</u>	2.4:1

Low

2. Life of Site

For the design of the landfill, the engineer calculated volume of available soil material to be obtained from the trench operation. Then utilizing the assumption that for every 2.5 yards of waste placed into the landfill one cubic yard of soil will be used to provide daily and intermediate cover and that on the average the entire waste area of the landfill will receive a minimum of 1.5 feet of final cover, the engineer then determined the volume of waste that could be deposited into the landfill. Based on these quantities of waste and soil, the final contours were determined. A breakdown of the estimated soil and waste quantities are indicated on the enclosed table.

NEW BIG TINDER LANDFILL

DESIGN CRITERIA

CUBIC YARDS

100,000
 100,000
 400,000

ITEM

Total Volume

Trenches
 Above Surface
 Total

Available Soil

100,000
 0
 100,000

Trenches
 Other

Total

Soil Requirements

100,000
 100,000
 200,000

Daily Cover (1.5 ft)
 Area Between Trenches
 Daily Cover

Total

Volume of Waste

100,000 cu
 100,000 Tons (1,000 lbs/cu)

Estimated Life of Site

Waste to Daily Soil Cover Ratio

2.4:1

To determine the approximate life of the landfill, the engineer estimates that the in-place density of the waste will be in the neighborhood of 1,000 lbs/cubic yard. This is based on the fact that the City will be utilizing a Track Loader for compacting the waste and applying the daily cover. Several studies have indicated that typically in-place densities of waste at landfills vary from approximately 400 lbs/cubic yard where very little compaction is provided to 800-1,000 lbs/cubic yard where larger (D-8) dozers or track loaders (Cat 973) are used and 1,200-1,400 lbs/cubic yard when landfill compactors with sheepsfoot wheels are used. Therefore the 1,000 lbs/cubic yard in-place density seems to be a realistic estimate for the landfill. Based on this coupled with the estimate that the site will receive approximately 2,000 tons per year of waste, it is projected that the site will have an estimated life of 61 years.

4. Drainage Control

When designing a landfill it is important that two criteria be met concerning drainage. These include: 1) making sure that no run-off that is generated off the site runs onto and over the areas that are filled with waste and 2) making sure that there is positive drainage from the waste filled areas to off the site.

Due to the topography of the area and the design of the trench locations, it is not anticipated that any surface drainage can enter the active landfill area from the west, east and south sides. The plan incorporates a ditch along the northwest, north and northeast sides of the site to divert any run-off in these areas from entering the site in these areas. In regard to drainage within the confines of the landfill areas, the site has been designed to slope away from all areas filled with waste. It is the intent to attain the final contours as designed after each area is completed. During the operation of each trench, it is also intended to fill from the north to the south in order that each trench will drain as it is filled.

5. Leachate Control

Due to the low amounts of moisture that fall in the area coupled with the on and off-site drainage control that has been included in the design of the landfill, it is very unlikely that any significant amount of leachate will be generated at the landfill site. If leachate is generated at the site, it will be important to monitor and contain the leachate on the site. In order to detect and collect any leachate that may be generated in the most effective and economical method possible, the operation plan has been developed such that the base elevation of the various trenches slope in a down gradient direction towards the south side of the landfill. If any leachate is generated to the degree that containment and collection is needed, a collection system could be installed along the southern end of each trench.

To determine the approximate life of the landfill, the engineer estimated that the in-place density of the waste will be in the neighborhood of 1,000 lbs/cubic yard. This is based on the fact that the City will be utilizing a Track loader for compacting the waste and applying the daily cover. Several studies have indicated that typically in-place densities of waste at landfills vary from approximately 800-1,000 lbs/cubic yard where very little compaction is provided to 1,000-1,200 lbs/cubic yard where heavy (D-8) dozers or track loaders (Cat 973) are used and 1,200-1,400 lbs/cubic yard when landfill compactors with pneumatic tires are used. Therefore the 1,000 lbs/cubic yard in-place density seems to be a realistic estimate for the landfill. Based on this coupled with the estimate that the site will receive approximately 2,000 tons per year of waste, it is projected that the site will have an estimated life of 61 years.

4. Erosion Control

When designing a landfill it is important that two criteria be met concerning drainage. These include: 1) making sure that no run-off that is generated off the site runs onto and over the areas that are filled with waste and 2) making sure that there is positive drainage from the waste filled areas to off the site.

Due to the topography of the area and the location of the trench location, it is not anticipated that any surface drainage can enter the active landfill area from the west, east and south sides. The plan incorporates a ditch along the northwest, north and northeast sides of the site to divert any run-off in these areas from entering the site in these areas. In regard to drainage within the confines of the landfill areas, the site has been designed to slope away from all areas filled with waste. It is the intent to retain the final contours as designed after each area is completed. During the operation of each trench, it is also intended to fill from the north to the south in order that each trench will drain as it is filled.

5. Leachate Control

Due to the low amounts of moisture that fall in the area coupled with the on and off-site drainage control that has been included in the design of the landfill, it is very unlikely that any significant amount of leachate will be generated at the landfill site. If leachate is generated at the site, it will be important to monitor and contain the leachate on the site. In order to detect and collect any leachate that may be generated in the most effective and economical method possible, the operation plan has been designed such that the base elevation of the various trenches is in a down gradient direction towards the south side of the landfill. If any leachate is generated in the design that containment and collection is needed, a collection system could be installed along the southern end of each trench.

D. Operation Plan

1. Responsibilities

The responsibility of the operation of the landfill will be with the City of Big Timber. The administrative responsibilities will be through the Mayor and City Council. The day to day operation will be the responsibility of the City foreman hired by the City Council.

2. General Operating Procedure

Currently it is the intent to keep the landfill open to the public on Wednesdays and Saturday afternoons from 1:00 to 5:00 p.m. The City of Big Timber will also dump approximately one packer load per day on Tuesdays, Thursdays and Fridays. The site will utilize a locked gate at the entrance to deter traffic during the times in which the site is not open. A sign at the entrance will indicate hours of operation as well as types of wastes that are acceptable.

3. Trench Excavation

The City will either lease a scraper or contract out the excavation of the trenches as required. The trenches will be excavated in accordance with the landfill plan.

4. Daily Operation Plan

The landfill will utilize a track loader for compacting and providing daily and intermediate cover at the site on each day that the site receives waste. To operate the equipment the City will provide an employee. This employee will also be responsible for controlling traffic and monitoring loads of waste. The landfill will accept only Group II and Group III type wastes at the site. It is expected that the employee will use the track loader to apply the final cover at the site as the trenches are completed. The City will also be responsible for maintaining the roads, etc.

5. Litter and Access Control

The City will install a perimeter fence, around the site as indicated on the plans. The perimeter fence will include hog wire with two strands of barbed wire on top. This fence should prevent illegal entrance of individuals as well as livestock. This fence should also catch litter that escapes the active fill area. The location of this new fence is indicated on the attached plans.

The City also will utilize four portable litter screens similar to those detailed on the plans. These screens shall be placed around the active filling area. The City also will provide labor as deemed necessary to hand pick litter that has accumulated on the litter screens, perimeter fences and within and outside the

landfill area. The City will also install the necessary signs to delineate to the public the location of the active filling areas. This should prevent indiscriminate dumping at the landfill site. If necessary, local law enforcement agencies will be used to prevent littering and indiscriminate dumping at the entrance gate and access roads leading to the site.

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